*SF2A 2004*
*F. Combes, D. Barret, T. Contini, F. Meynadier and L. Pagani (eds)*

# EMISSION LINE STARS IN YOUNG OPEN CLUSTERS WITH ESO-WFI SPECTROGRAPH.

Martayan,C.[1], Hubert,A-M.[1], Floquet,M.[1], Baade,D.[2] and Fabregat,J.[3]



**Abstract.** This work deals with the search of Be stars and sources with H$\alpha$ emission line in the Large and Small Magellanic Clouds on the one hand, and in open clusters (NGC6611 & West1) in the Milky Way on the other hand. Observations were obtained with the Wide Field Imager in spectrograph mode. We present first results and a comparison with our VLT-FLAMES study.

## 1 Introduction

The origin of the "Be phenomenon" is still unknown; whether and how the frequency of Be stars depends on age and metallicity remains a crucial question. Various recent studies using limited and inhomogeneous observational data have given ambiguous results. Moreover, the number of young clusters observed in Magellanic Clouds in H$\alpha$ photometry is still limited (Keller et al 1999). We present preliminary results on a search of H$\alpha$ emission line stars in the central part of the LMC and the SMC and in 2 young open galactic clusters, with slitless H$\alpha$ spectroscopy.

## 2 Observations and reduction

60 fields (34'$\times$ 33') were taken with the ESO Wide Field Imager(WFI) in spectroscopic mode at the 2.2m telescope on La Silla. First, with the R50 grism + H$\alpha$ filter used for crowdy MC clusters, we expect to observe spectra with two peaks for emission line stars: at the filter maximum and at the H$\alpha$ line position. In fact, in case of strong emission, the spectrum presents a very strong double peak structure which does not peak exactly at the H$\alpha$ and at the maximum filter position. The supposed origin of this spectrum is an interference phenomenon between an

[1] GEPI, UMR 8111, Observatoire de Paris-Meudon, France
[2] ESO Garching, Germany
[3] Universidad de Valencía, España

uneven flux distribution due to a very strong H$\alpha$ line and a smooth filter profile. Second, with yhe R50 grism + Rc (broad) filter for young galactic open clusters, we expect to distinguish "true" Be stars from B stars embedded in nebulosities in NGC6611 and to detect Be stars in Westerlund1. To reduce the data, we use Iraf packages written for mosaic pictures and the Sextractor software (Bertin & Arnouts 1996). After a definition of tests needed to select exploitable sources, we treat 45000 among 80000 sources on average in each H$\alpha$ field.

## 3 Results for Magellanic Clouds

We list 300 objects with H$\alpha$ emission line in the field of NGC330 in the SMC. A number of known Be stars are present in our catalog and we can therefore test our method on these objects. Furthermore, we confirm the detection of new emission line stars obtained in October 2003 with VLT/FLAMES. Emission line stars found with VLT-FLAMES are present in our WFI catalog.

## 4 Results for Milky Way clusters

a) NGC 6611: Previous studies (slit spectrographs) proposed a list of emission line stars (Hillenbrand et al 1993, de Winter et al 1997). However, NGC 6611 is embedded in the Eagle nebula and the nebular lines especially at H$\alpha$, strongly pollute all slit spectra. Herbig et al (2001) observed this cluster with a slitless spectrograph and only confirmed 4 emission line stars. We confirm the results of Herbig et al (2001) and we discovered 3 new emission line objects.
b) We observed the NG6611 cluster with the VLT-FLAMES (in April 2004) with the new high resolution gratings. Due to the high resolution it is possible to distinguish between emission line from nebulosity and from the circumstellar environment of B stars and we are able to confirm our WFI results. We also discovered 2 other new Be stars.
c) Westerlund 1: No Be stars are found among the 13000 spectra.

## 5 Future

This work will be performed on the 59 other fields observed with WFI. We then plan to create a database for sources with H$\alpha$ emission line in Magellanic Clouds.

## References

Bertin & Arnouts 1996, A&A, 176, 58
De Winter et al 1997 A&AS 121, 223
Herbig et al 2001 PASP 113, 195
Hillenbrand et al 1993 AJ 106, 1906
Keller et al 1999, AASS, 134, 489